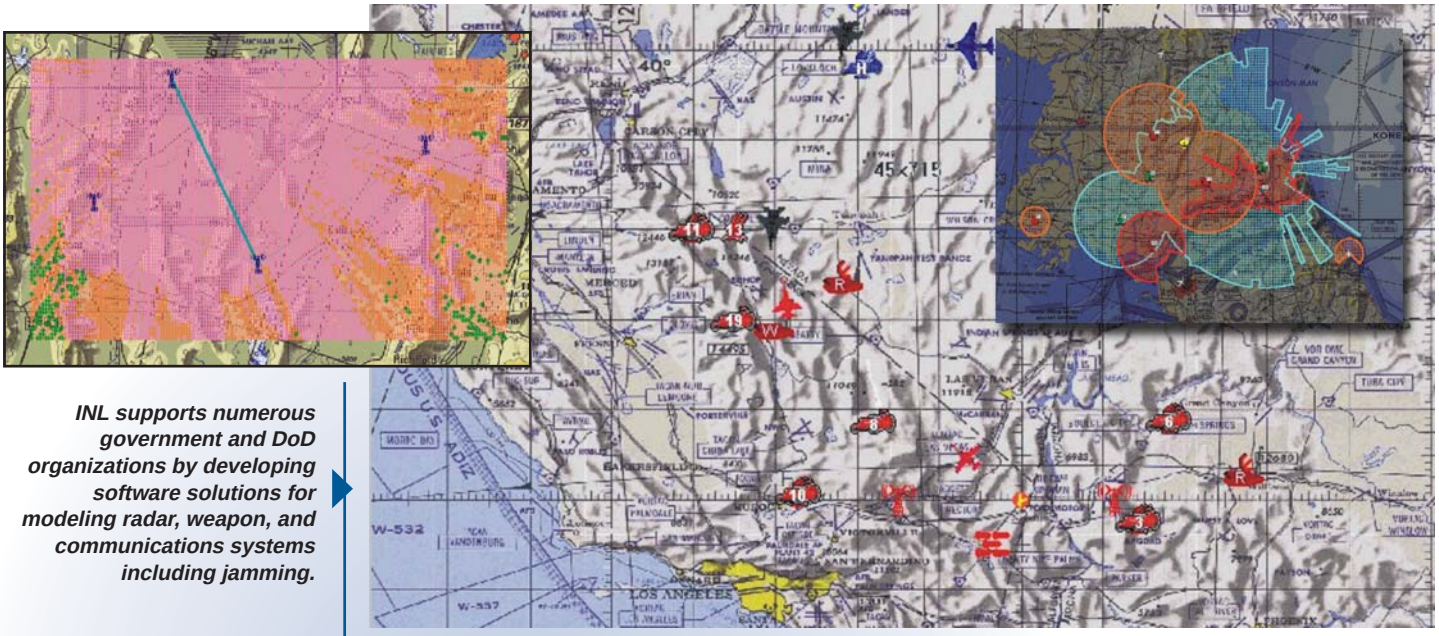

INL supports numerous government and DoD organizations by developing software solutions for modeling radar, weapon, and communications systems including jamming.

Electronic Combat System Integration (ECSI)

National Security

Idaho National Laboratory

Background

The Electronic Combat System Integration (ECSI) project at Idaho National Laboratory (INL) supports the missions of the Air Force Information Warfare Center, 453rd Electronic Warfare Squadron (EWS) located at Lackland AFB, San Antonio, Texas. The primary focus of the ECSI project is to develop software that enhances the threat analysis capabilities of the 453rd EWS.

Initiated in June of 1989, the ECSI project has been involved with the development and enhancement of several radar, weapon and communications threat software models.

These include:

- the Improved Many-On-Many (IMOM) Planner software application,
- the Improved Many-On-Many (IMOM) Engineer software application
- the Distributed Information Warfare Constructive Environment (DICE) simulation software,
- IMOM server products; i.e. stand-alone Application Programmer Interface (API) libraries, and
- IMOM web-based technology.

IMOM^{Planner}

IMOM^{Planner} visually displays the complex interaction of multiple ground-based radar systems being acted upon by multiple airborne Electronic Counter Measures (ECM) aircraft. IMOM^{Planner} models the detection capabilities of radar effects, the effects of Stand-Off Jamming (SOJ) platforms, and the effects of Self-Protection Jamming (SPJ) platforms. IMOM^{Planner} is capable of loading a detailed Order of Battle (OB) for virtually any geographic region of the world, add the effects of terrain masking and ECM on the OB, exploit the results to perform a variety of analyses. IMOM^{Planner} models virtually any type of ground or airborne radar system, virtually any type of jamming system, and any airborne platform.

IMOM^{Engineer}

IMOM^{Engineer} is primarily a reconnaissance (signal collection) and communications analysis tool. IMOM^{Engineer} has a variety of modes to analyze a scenario from an Electronic Support (ES) or an Electronic Attack (EA) perspective. IMOM^{Engineer} predicts how well a receiver can collect an emitter's signal within a geographic area. IMOM^{Engineer}'s route analysis indicates the ability of the

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receiver platform to detect an emitter from points along a planned flight route.

IMOM[Engineer] also has four communication analyses modes: Network Analysis, Link Analysis, Transmission Radial Analysis and Route Analysis. Network analysis shows the potential capabilities of a communication network within an OB, with or without a jammer present. Transmission Radial or rings analysis graphically depicts jammer effectiveness on the communications coverage of a transmitter(s). Link analysis shows jammer effectiveness on a given communications link as the jammer is moved within a specified area of interest. Route analysis indicates the ability of an EA platform to affect a communications network from points along a planned flight route.

IMOM[Engineer] analyzes the detection/location ability of a network of passive detection (PD) sites against airborne emitters placed in the OB. IMOM[Engineer] has a variety of analysis modes to analyze a scenario. These include a radial analysis, a route analysis, and a grid analysis. The radial analysis depicts how well a receiver site can detect a target emitter's signal within a geographic area. The route analysis indicates the ability of a receiver group to detect and locate an emitter platform from points along a planned flight route. The grid analysis indicates a receiver group's ability to detect and locate an emitter platform over a specified area of interest. The route and the grid analyses use both DOA (direction of arrival) and TDOA (time difference of arrival) algorithms in determining location capability of the receiver group.

DICE

DICE is a Distributed Mission Training (DMT) tool that allows analysts to quickly develop an order of battle (OB) and inject computer generated entities into a real-time synthetic battlefield. DICE has been integrated into the CV-22 simulator and the EA-6B simulator. DICE supports multiple roles in numerous exercises, including the Expeditionary Forces Exercise (EFX), ROAD-RUNNER, Joint Suppression of Enemy Air Defenses (JSEAD), BLUE FLAG (BF), and the Air Defense Experiment (ADX). These roles may include Ground Air Defense, Offensive and Defensive Air Operations, Electronic Warfare, Intelligence, Surveillance, and Reconnaissance, Command and Control (C2), and Ground Targets. .

Summary

The ECSI software has been integrated into a wide variety of Air Force and Joint programs including

- Contingency TACS Automated Planning System (CTAPS),
- Theater Battle Management Core Systems (TBMCS),
- the Global Command & Control System (GCCS) Integrated, Imagery and Intelligence (I3) program, and
- Portable Flight Planning System (PFPS) program.

In addition, AFIWC continues to support stand-alone users of the models worldwide. Validation of our models and the software algorithms has been conducted and are available upon request from the AFIWC.

For more information

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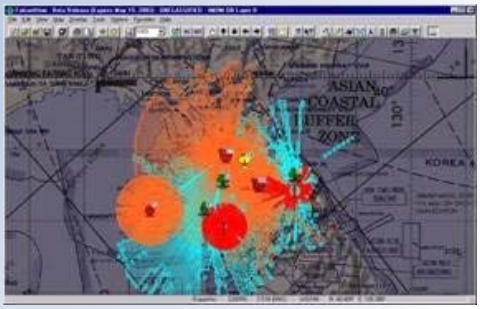
Cv22 Simulator



Sample IMOM Screen